Determining the Current Cost of Producing Milk in Maine 2013

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Maine Department of Agriculture, Conservation, and Forestry
and the Maine Milk Commission

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Introduction

As directed by *An Act to Encourage the Future of Maine's Dairy Industry* (Chapter 648 H.P. 1445-L.D. 1945), our research goal was to determine the cost of producing fluid milk for selected dairy farms in Maine that fall into four levels of milk production, or Tiers, established by L.D. 1758 and defined in Maine Revised Statutes, Title 7, Section 3153-b. For the 2013 study, we collected detailed economic and production performance data involving onsite interviews to accurately measure each dairy farm's costs of production. We carefully reviewed their financial data including farm accounting records and tax forms.

Methods

Initial surveys were mailed to all conventional Maine dairy farms that shipped milk to a wholesale market in 2013. Of these 217 farms, 94 producers responded with initial production, labor, acreage in feed crops, recordkeeping, and whether the farmer had a freestall/parlor or stanchion/tiestall for housing. This represented a response rate of 43%.

Farms were divided into four groups based on production volumes (tiers). Researchers selected farms from each tier to include in the detailed economic performance data collection process (Table 1). Numbers from each tier were selected to represent the proportion of producers in Maine in each tier. Amish farms were included at the request of the Commission. Selections were also made to ensure representation from farms with different housing systems—free stall vs. stanchion or tie stall. Of the 40 farms selected, there were several farms that withdrew from the process, and our research team replaced them with similar farms to fit the appropriate tier production level, number of cows, and housing type.

Maine Conventional Milk Industry Cost of Production Study, 2013	Tier 1	Tier 2	Tier 3	Tier 4
Number of farms in industry (Total = 217)	156	42	3	16
Number of farms in study (Total = 40)	23	10	3	7
Average milk produced by study farms (millions of pounds)	0.747	3.39	5.82	16.75
Average number of cows on study farms*	55	156	260	674

* The number of cows reported by farmers

Table 1. Characteristics of farms, 2013

Complete data were obtained from 40 farms. During the visits, all relevant cost components to determine short run break even (SRBE) were collected. Further, from Schedule F and Form 4562 on 2013 tax forms, we recorded the breakdown of depreciation costs. We asked farmers the value of expenses pre-paid in 2012 for 2013 and in 2013 for 2014 as well as open accounts carried forward from 2012 to 2013. Lastly, we asked farmers the number of unpaid family labor hours they had in 2013.

Cash operating costs were adjusted for prepaid expenses in both years 2012 and 2014. Categories of operating costs included hired labor, dairy feed, machinery rent/lease, machinery repairs, fuel, breeding, veterinary, medicine, milk marketing, dues, bedding, licenses/registration, utilities, milkroom supplies, production testing, fertilizer/lime/sprays, repairs, property taxes, interest, insurance, and miscellaneous livestock expenses. The Maine Milk Commission asked for adjusted cash operating costs as the cost of production for this study. This calculation is different from calculations of cost of production in previous studies.

Before calculating average costs for each tier, using a method called a q-q plot (Figure 1), we graphed the data to test for normality and the presence of outliers (Hogg, Tanis, and Zimmerman, 2015). Using statistical tests called Kolmogorov-Smirnov, Cramer-von Mises, and Anderson-Darling tests, we were able to determine that the data were not normally distributed and that there were significant outliers. These outliers skewed the distribution above and below the solid line in the q-q plot (Figure 1). Based on these plots and tests, we removed three outliers and reconstructed a q-q plot of the data after outlier removal to demonstrate its normality (Figure 2); the data follow a normal distribution much more closely after outlier removal. Final analysis was performed on these 37 farms.

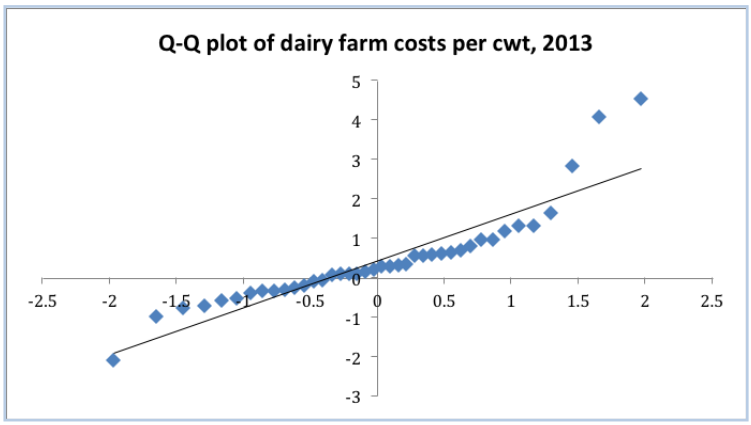

Figure 1. Q-Q plot of dairy farm costs per cwt, 2013

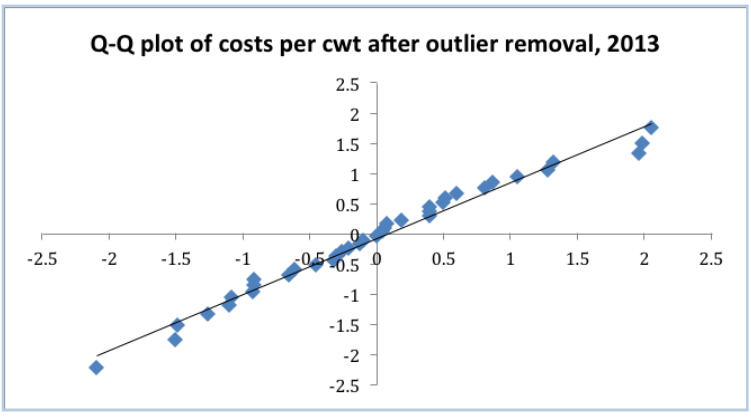

Figure 2. Q-Q plot of costs per cwt after outlier removal, 2013

Every attempt was made to decipher forage expense for production of milk on the farm and forage expense to produce forage that was sold to other producers. For example, there were farms that produced more acres of corn silage than they used on their farm; forage from these extra acres was used as an additional source of income and sold to other farms. We adjusted the crop production expenses to cover the crops that were actually used for milk production on the farm.

We felt it was important to use the same calculation procedures as was used in previous studies to provide consistency. Corporations were converted to single proprietorships by removing the owner from the hired labor to try and balance the paid labor situation. We made the adjustment by taking the $35,000 that was

used in the 2010 study from the labor costs of each corporation and adjusting it to the change in the Consumer Price Index in the interim; the adjusted value used in the current study was $37,229.

Results

The cost of production for this study was the adjusted cash operating costs, which represents total expenditure per cwt rather than the total costs of producing milk. cost is displayed in Table 2.

Table 2. Cost of Production, 2013

Maine Conventional Milk Industry Cost of Production Study, 2013					
	Tier 1	Tier 2	Tier 3	Tier 4	All Farms
Average Cost of Production per cwt	$25.21	$24.03	$22.19	$21.84	$23.89

Discussion

Collecting detailed information from farms was made more difficult by the numerous systems each business uses for accounting of costs. Some farms had non-milk producing enterprises within the farm accounting system which we worked to separate. Every attempt was made to normalize the costs into categories that could be used for our analysis. Researchers would like to thank the producers who cooperated in the study for all the time and effort they spent dealing with our questions.

An analysis of the 2013 dairy production year should include a description of the national and global impacts that 2012 had on the industry. 2012 saw a simultaneous drop in milk prices and an increase in feed costs, which was in addition to the highest production costs to date, which nearly tripled for U.S. producers since 2000 (Sommer and Eastridge 2014). Purchased feed costs remain the single largest expense on most Maine farms and reflect the higher cost of ingredients in the state.

In an effort to standardize the definition of cost of production calculations, we are specifying exactly what and what not was included and how each calculation was done for use with future studies. The purpose of this is to set a precedent for a clear and consistent definition for future SRBE analyses and provide an opportunity for data comparison across Cost of Production studies. We will continue to evaluate the data to identify practices and key management factors that are present in farms with higher profitability and use that information in our education efforts within Extension.

Citations

Hogg, R., Tanis, E., & Zimmerman, D. (2015). Point Estimation. In *Probability and statistical inference* (Ninth ed., pp. 238-256). Pearson Education.

Sommer, C., & Eastridge, M. L. (2014). Global Dairy Developments–An Overview on Milk Prices and Milk Production Costs World Wide. In Proceedings of the 23rd Tri-State Dairy Nutrition Conference, Fort Wayne, Indiana, USA, 14-16 April 2014 (pp. 1-9). Ohio State University.

Appendix
Preliminary questionnaire

Please indicate the average number of milking cows for the calendar year 2014 _____

Please indicate the pounds of milk shipped in 2013_____

Anticipated pounds of milk shipped in 2014 _____

Current level of milk produced per day_____
or per pick up _____(if every other day pick-up)

Indicate your purchaser of milk _____

What type of financial recordkeeping system do you use?

a) Farm Account book
b) Quick books or other software package
c) Check book ledger
d) Outside accountant
e) Farm Credit or other business analysis program?
f) Other? (Please indicate) _____

Do you use a pasture based grazing system? Yes____ No ____

Do you grow corn silage? Yes _____ No_____

Number of acres of pasture____ Grass/legume hay or silage_____ Corn silage_____

Are you enrolled in a production record keeping system such as DHIA or some other computerized record keeping system? Yes____No____

Number of full time hired (non family) employees_____

Number of full time family labor_____

Do you milk in a parlor _____ or stanchion barn_____?